Serial No. 10/037,588

<u>Drawing Amendments</u>

There are no amendments to the drawings.

Serial No. 10/037,588

Remarks

     This a full and timely response to the outstanding Final Office Action mailed on 07/18/2005. In response, please enter the amendments and consider the following remarks. The Office Action of 01/25/2005 rejected claims 1, 11 and 17 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Further, claims 1-5, 11, 17-19, 21, and 27-30 were rejected as being unpatentable under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,644,625 of E.L. Solot (hereafter referred to as Solot). Also, claims 6-10, 12-16, 22-26, and 31 were rejected under 35 U.S.C. §103 as unpatentable over Solot in view of U.S. Patent No. 6,088,428 of D. Trandal, et. al (hereafter referred to as Trandal). Finally, claims 1, 17, and 27 were objected to for informalities. Claims 1, 4, 6, 8, 11, 17, 22, 27, and 29 are being amended. No claims are cancelled in this response.

General Comments

     Applicants' attorney wishes to thank the Examiner for the telephonic interview of 10/18/2005. During the telephonic interview, applicants' attorney proposed claims which were discussed but whose patentability was not decided. Applicants' attorney appreciated the opportunity to explain how the specification and drawings support the proposed claim. The amendments to the claims suggested by the Examiner have been incorporated into the amended claims presented in the present response.

Objection to Claims 1, 17 and 27

     Claims 1, 17, and 27 were objected to for reciting the phrase, "analyzing using automatic speech recognition analysis calculations...the received audio information for tones" because the Office Action held that

- 10 -

the specification only used the word "detecting" when referring to tones. As detailed in the rejection of claims 1, 11 and 17 under 35 U.S.C. §112, second paragraph, section, the specification does supply support for this phrase.

Rejection of Claims 1, 11 and 17 under 35 U.S.C. §112, Second Paragraph

This rejection is respectfully traversed. The Office Action has rejected claims 1, 11, and 17 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Office Action states:

> Claim 1 lines 6-8, claim 11 line 8, and claim 17 lines 9-12 recite the newly added limitation of "analyzing using automatic speech recognition analysis calculations...the received audio information for tones.. ." Speech recognition analysis calculations can not be found and therefore makes the claims indefinite as Examiner interprets this as still using the method of speech recognition which was previously rejected as not enabling. Applicant's specification does not disclose how using speech recognition analysis (eg. Hidden Markov Model) is able to analyze tones. Applicant's 'tone detector' within a speech recognition unit enables the analysis (page 17 line 12-page 18 line 18)".

The application discloses three embodiments for a call classifier. The first embodiment is illustrated in FIG. 2C, the second embodiment is illustrated in FIGS. 2A and 8-11 and accompanying text, and the third embodiment is illustrated in FIGS. 2B, 12, and 13 and accompanying text. However, the application is clear that the tone detector or its method is only used in the first embodiment. At present, there are no claims directed to the first embodiment. The following details how the second and third embodiments provide support for amended claims 1, 11, and 17.

Consider how the third embodiment provides support for amended claim 1 reciting "analyzing using the automatic speech recognition analysis calculations the received audio information for

- 11 -

tones...." On page 27, line 5 through page 28, line 7, the specifications states the following:

> FIG. 12 illustrates, in flowchart form, the third embodiment of block 207. Since in the third embodiment speech and tones are processed in the same HMM analysis, there is no equivalent blocks for block 802, 804, 805, and 806 in FIG. 12. Block 1201 accepts 10 milliseconds of framed data from switching network 102. This information is in 16 bit linear input form. This data is processed by block 1202. The results from block 1202 (which performs similar actions to those illustrated in FIG. 10) are transmitted as a full feature vector to block 1203. Block 1203 is receiving the input feature vectors and performing a HMM analysis utilizing a unified model for both speech and tones...Greater details on block 1203 are illustrated in FIG. 13. After the operation of block 1203, decision block 1204 determines if an end-point has been reached which is a period of low energy indicating silence. If the answer in no, control is transferred back to block 1201. If the answer is yes, control is transferred to block 1205 which records the length of the silence before transferring control to decision block 1206. Decision block 1206 determines if a complete phrase or cadence has been determined. If it has not, the results are stored by block 1207, and control is transferred back to block 1201. If the decision is yes, then the phrase or cadence designation is transmitted on a unitary message path to inference engine 201. Decision block 1209 then determines if a halt command has been received from controller 209. If the answer is yes the processing is finished. If the answer is no, control is transferred back to block 1201.

The third embodiment clearly provides support for the step of "analyzing using the automatic speech recognition analysis calculations the received audio information for tones...." of amended claim 1. In addition, the third embodiment provides support for amended claims 17 and 27. As well be detailed in the following paragraphs, the second embodiment also clearly provides support for amended claims 1, 17, and 27.

Consider how the second embodiment provides support for amended claim 11 reciting "detecting for speech in received audio information;...analyzing using automatic speech recognition the received

- 12 -

audio information for tones in response to the detection of speech
indicating an absence of speech."

The step of "detecting for speech in received audio information"
is supported by the specification stating "Block 802 performs a fast speech
detection analysis to determine whether the information is a speech or a
tone. The results of block 802 are transmitted to decision block 804. In
response, decision block 804 transmits a speech control signal to
block 805 or a tone control signal to block 806." (See page 23, lines 18-
22.)

The step of "analyzing using automatic speech recognition the
received audio information for tones in response to the detection of
speech indicating an absence of speech." is supported by the specification
stating "Block 806 is responsive to this full feature vector from block 803
and a tone control signal from decision block 804 to add special feature
bits to the full feature vector identify it as a vector that contains a tone.
The output of block 806 is transferred to block 807. Block 807 performs a
Hidden Markov Model (HMM) analysis on the input feature vectors. One
skilled in the art would readily realize that other alternatives to HMM could
be used such as Neural Net analysis. Block 807 as can be seen in
FIG. 11 actually performs one of two HMM analysis depending on whether
the frames were designated as speech or tone by decision block 804."
(See page 24, lines 1-12.)

The second embodiment clearly provides support for the steps
of "detecting for speech in received audio information;...analyzing using
automatic speech recognition the received audio information for tones in
response to the detection of speech indicating an absence of speech."

The second embodiment also clearly provides support for
amended claims 1, 17, and 27 reciting the step of "analyzing using the
automatic speech recognition analysis calculations the received audio
information for tones...."

- 13 -

In summary, amended claims 1, 11, 17 and 27 clearly meet the requirements of 35 U.S.C. §112, second paragraph, and also the requirements of 35 U.S.C. §112, first paragraph.

Rejection of Claims 1-5 under 35 U.S.C. §102(b)

Amended claim 1 recites:
A method for performing call classification for a destination endpoint on a call, comprising the steps of:
receiving audio information from the destination endpoint;
analyzing using automatic speech recognition analysis calculations the received audio information for words;
analyzing using the automatic speech recognition analysis calculations the received audio information for tones; and
determining a call classification for the destination endpoint in response to the analysis of the words and the analysis of the tones.

The Office Action states:

Regarding claims 1 and 17 Solot teaches a method for doing call classification on a call to a destination endpoint, comprising the steps of:
receiving audio information from the destination endpoint(col.2 lines 3-19) and analyzing using speech recognition analysis calculations the received audio information for a first type of classification.(col.5 lines 31-62);
analyzing using the automatic speech recognition analysis calculations the received audio information for a second type of classification wherein the second type of classification is for identification of tones(col.5 lines 31-62; Solot's system uses analysis calculations to identify tones) and
determining a call classification for the destination endpoint in response to the analysis of the first type of classification and the analysis of the second type of classification (col.5 lines 1-4, 31-62 and col.6 lines 20-25).

The first cited text from Solot states:

The inventive apparatus recognizes the standard intercept tone by well known techniques which isolate the intercept tone from other audio signals and to determine the presence or absence of the intercept tone. The telephone company when a telephone number is changed, disconnected or other such happening that will not allow the call to be completed will intercept the incoming call and present a recorded voice message back to

- 14 -

the caller stating why the call cannot be completed--this is the intercept message and is preceded by a tone or group of tones. When the tone or tones is received the present system will record the voice intercept message.

The present system analyzes the voice message via the voice recognition board (FIG. 1, item 13). The software and the hardware that analyzes the voice is capable of providing a confidence level associated with the decoding of the voice message. A threshold 109 is provided such that when the confidence level meets or exceed the threshold the message contents are processed for a change in telephone number 111. The confidence level is built into the software supplied with the Voice Recognition board. This software determines what the utterance is and supplies a number form zero to 99 to indicate confidence in the utterance being properly determined. The system software will decide what level is suitable for acceptance depending on the errors encountered in a real world environment. If a new telephone number is provided the call may be placed to the new number 115 or a prompt to the caller informing 117 the caller of the new number. If the caller does not want to call the new number the system reverts back to the start 100. Otherwise, if the caller wishes, the new number is dialed and the state reverts to state 102.

The cited text clearly does not state that the tones are identified using automatic speech recognition; rather, the cited text states "The inventive apparatus recognizes the standard intercept tone by well known techniques which isolate the intercept tone from other audio signals and to determine the presence or absence of the intercept tone." These well known techniques are mostly likely performed by board 11 which performs tone detection along with other operations. There is no indication that these well known techniques include using automatic speech recognition which could not be known except from applicants' patent application. Further, there is no disclosure or suggestion that Voice Recognition Board 13 is involved in recognizing the intercept tone. In summary, there is no disclosure or suggestion in Solot that the intercept tone is detected using automatic speech recognition.

In summary, Solot does not anticipate amended claim 1 under 35 U.S.C. §102(b). Claims 2-5 are directly or indirectly dependent from

amended claim 1 and are patentable for at least the same reasons as
amended claim 1.

Rejection of Claim 11 under 35 U.S.C. §102(b)

Claim 11 is patentable under 35 U.S.C. §102(b) for the same
reasons as amended claim 1.

Rejection of Claims 17-21 under 35 U.S.C. §102(b)

Claim 17 and claims 18, 19 and 21, as presently in the
application, are patentable under 35 U.S.C. §102(b) for the same reasons
as amended claim 1 and claims 2-5.

Rejection of Claims 27-29 under 35 U.S.C. §102(b)

Claim 27 is patentable under 35 U.S.C. §102(b) for reasons
similar to those set forth for amended claim 1. Claims 28 and 29 are
directly or indirectly dependent on claim 27 and are patentable for at least
the same reasons. Claim 30 had been previously withdrawn.

Rejection of Claims 6-10 under 35 U.S.C. §103(a)

Claims 6-10 are directly or indirectly dependent on amended
claim 1 and are patentable for at least the same reasons as amended
claim 1. Amended claim 1 is also patentable under 35 U.S.C. §103(a)
over Solot in view of Trandal. The Office Action states that "Trandal, as
best understood due to the 112 issues above, discloses using a Hidden
Markov Model to determine the presence of words and/or tone in audio
information (col. 8 lines 16-25 and col. 23 lines 17-28)". Trandal does
disclose using a Hidden Markov Model to identify words but not to identify
tones. The cited text at Col. 8, lines 16-25 states:

Over a frame duration, the DSP processes the signals
represented by the received frames and transmit frames, for each
channel of activity, as directed by DSP software In the program
store. The DSP can perform several different types of processing
including speech encoding and decoding, companding, tone
detection and generation, speech recognition, text-to-speech
conversion, etc. All require DSP processing or computation. Thus,

- 16 -

Serial No. 10/037,588

the frame duration determines the maximum total number of computations possible per frame of transmit and receive data.

The cited text clearly does not state that the tone detection is being performed using any type of speech recognition but rather that tone detection is just one of a number of operations that the DSP can perform.

The cited text at col. 23, lines 17-28 states:

If no DTMF digits are detected then state 548 is entered to process a voice utterance by the subscriber. As described in detail below, the DSP generates a hidden Markov model template for the utterance and compares the input template to the subscriber's stored template which was generated in the enrollment mode described above. In one preferred embodiment the DSP is also provided with means, in a subroutine of a stored program, to provide a subscriber with access to a mailbox extension. If extension service is enabled then control is passed on branch 552 to state 720 (not shown in detail) to process access to a mailbox extension.

Clearly, the cited text has no disclosure or suggestion of using any type of speech recognition technique to identify tones. Amended claim 1 is patentable under 35 U.S.C. §103(a) over Solot in view of Trandal. Claims 6-10 are directly or indirectly dependent on amended claim 1 and are patentable for at least the same reasons as amended claim 1.

Rejection of Claims 12-16 under 35 U.S.C. §103(a)

Claims 12-16 are directly or indirectly dependent on amended claim 11 and are patentable under 35 U.S.C. §103(a) over Solot in view of Trandal for similar reasons as those set forth for claims 6-10.

Rejection of Claims 22-26 under 35 U.S.C. §103(a)

Claims 22-26 are directly or indirectly dependent on amended claim 17 and are patentable under 35 U.S.C. §103(a) over Solot in view of Trandal for similar reasons as those set forth for claims 6-10.

Rejection of Claim 31 under 35 U.S.C. §103(a)

Claim 27 is patentable under 35 U.S.C. §103(a) over Solot in view of Trandal for similar reasons as those set forth for amended claim 1.

Serial No. 10/037,588

Claim 31 is directly dependent on claim 27 and is patentable for least the same reasons.

Comments on the Office Action's "Response to Arguments" Section of the Office Action

Applicants' attorney appreciates the Examiner's response to applicants' arguments. The Examiner stated:

> As previously noted, applicant's specification does not perform speech recognition to identify tones <u>in the received audio information from the destination endpoint.</u> Applicant's arguments of the pending claims are inconsistent with the specification because as noted in the arguments Fig.8, step 806 is the addition of special feature bits which is not analogous to the currently recited limitation of *"analyzing using the speech recognition analysis calculations the received audio information for identification of tones in the audio information"*; In other words, the special feature bits are added to the received audio information by applicant's system <u>after receiving the audio information</u> and therefore this argument and specific embodiment step can not read onto the claims as currently recited.

> As mentioned in the last action, Applicant states in the previous argument that blocks 1111-1116 of Fig.11 and accompanying text of specification (page 26, line 25-page 27 line 3) and Fig.12-13(page 27 lines 13-20) teaches that HMM analysis is used for identification of tones. Examiner respectfully disagrees as these references by the applicant comes after the result of tone detection (see step 804 of Fig.8; specification page 24 lines 9-22) and therefore HMM analysis is not used for tone detection, the result of the tone detection is inputted to the HMM analysis along with the speech. Tone detection methods by way of frequency and timing patterns is taught on page 17 line 12-page 18,1ine 18 of specification.

> It is hereby noted, that the claims are not limited to identifying tones using speech recognition but rather analysis calculations in which Solot's system (and any system) performs when analyzing audio, Solot performs analysis calculations on audio information to identify tones in col.5, lines 31-62.

First, step 804 is only used in the second embodiment, FIG. 2A and FIGS. 8-11, and is not used in the third embodiment, FIG. 2B and FIGS. 12-13. Further, applicants respectfully submit that the Examiner

- 18 -

misunderstands the purpose of block 804. The application states at page 23, line 18 through page 24, line 12:

> Block 802 performs a fast speech detection analysis to determine whether the information is a speech or a tone. The results of block 802 are transmitted to decision block 804. In response, decision block 804 transmits a speech control signal to block 805 or a tone control signal to block 806. Block 803 performs the front-end feature extraction operation which is illustrated in greater detail in FIG. 10. The output from block 803 is a full feature vector. Block 805 is responsive to this full feature vector from block 803 and a speech control signal from decision block 804 to transfer the unmodified full feature vector to block 807. Block 806 is responsive to this full feature vector from block 803 and a tone control signal from decision block 804 to add special feature bits to the full feature vector identify it as a vector that contains a tone. The output of block 806 is transferred to block 807. Block 807 performs a Hidden Markov Model (HMM) analysis on the input feature vectors. One skilled in the art would readily realize that other alternatives to HMM could be used such as Neural Net analysis. Block 807 as can be seen in FIG. 11 actually performs one of two HMM analysis depending on whether the frames were designated as speech or tone by decision block 804.

Clearly, step 804 is not performing any type of analysis to determine one of a plurality of tones but only transmitting one of two control signals in response to a determination by block 802. Further, block 802 is analyzing for speech information and not tone information. Also, block 806 only adds bits to the full the full feature vector to identify that it contains a tone but does not identify the tone. In response to a control signal from block 804, it is block 807 using the received audio information that is determining one of the plurality of tones as further is detailed in FIG. 11. (Details of the operations of block 807 are provided by FIG. 11 and accompanying text.) There is no disclosure or suggestion that block 804 is implementing the tone detection method used by tone detector 203 of FIG. 2C of the first embodiment.

Applicants respectfully submit that the specification provides support as required for the amended independent claims under 35 U.S.C.

Serial No. 10/037,588

§112, first paragraph, and that the amended independent claims meet the requirements of 35 U.S.C. §112, second paragraph.
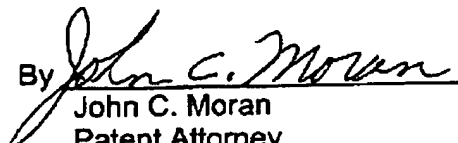
Summary

In view of the foregoing, applicants respectfully request consideration of amended claims 1, 4, 6, 8, 11, 17, 22, 27, and 29, reconsideration of claims 7, 9, 10, 12-16, 19, 23, 25, 26, and 31, as presently in the application, and allowance of these claims.

Although the foregoing is believed to be dispositive of the issues in the application, if the Examiner believes that a telephone interview would advance the prosecution, the Examiner is invited to call applicants' attorney at the telephone number listed below.

Respectfully,

Michael K. Brown
Norman C. Chan
Sharmistha Sarkar Das
David J. Skiba
Danny M. Wages

By _John C. Moran_
John C. Moran
Patent Attorney
Reg. No. 30,782
303-450-9926

Date: _11/16/2005_

John C. Moran, Attorney, P.C.
4120 115th Place
Thornton, CO 80233

- 20 -